

Atmos. Meas. Tech. Discuss., referee comment RC1
<https://doi.org/10.5194/amt-2021-70-RC1>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on amt-2021-70

Anonymous Referee #1

Referee comment on "Compositional data analysis (CoDA) as a tool to evaluate a new low-cost settling-based PM₁₀ sampling head in a desert dust source region" by Yangjunjie Xu-Yang et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-70-RC1>, 2021

The use of "low cost" PM₁₀ heads can be of interest in desert dust source areas to chemically characterize mineral dust and for further evaluation of PM₁₀ levels. The manuscript presents a new PM₁₀ sampling head and discuss the use of Compositional data analysis (CoDA) for the performance evaluation of the new inlet.

The main objective of this paper is to show that a low-cost decanter tube can replace an impaction-based PM₁₀ sampling head for proper aerosol sampling. However, this objective is not exactly reflected in the title that focus on the use of the CoDA as a tool to evaluate a new low-cost settling-based PM₁₀. The objectives of this paper should be clearly stated at the end of the introductory section.

The interest of a new head for PM₁₀ sampling at source areas should be justified. The manuscript concluded that both the new inlet and the commercial one can be indistinctly used. However, the advantages of the new inlet are not clearly justified.

As stated by the authors, differences on the chemical compositions of samples collected simultaneously by both VDT and commercial PM₁₀ heads may differ due to "contamination, size segregation of particles, and mineralogical fractionation during sampling". Thus, one of the reasons of the using the new VDT sampler is the potential contamination of the sample when using the PM₁₀ commercial due to wear of the metal impact plate. The results show similarity between the two samplers and appear to indicate that there is no contamination. Have you observed a contamination of the PM₁₀ sample by Al due to the friction of the particles with the aluminum plate? Regarding the chemical composition of the filters collected with both samplers and presented in the tables, it seems that there is no enrichment in Al in those filters collected with the commercial entry of PM₁₀. Therefore, the contamination cannot be confirmed.

The methods used in the article for the evaluation of PM₁₀ inlet are adequate. However, it

would have been interesting to make the comparison of PM10 concentrations directly from gravimetric determinations, in addition to the comparison of the chemical composition.

The concept "Compositional data analysis (CoDA)" only appears in the Title and conclusions sections. It should be also mentioned in the introduction section, at least, as one of the objectives of the paper and in the methodology section. The acronym "CoDA" is only used in the Title.

It is concluded in the paper that there are not differences were evidenced for samples collected near a source region. I understand you refer to a source region of mineral dust. Please, specify this in the text.

Have you evidenced differences between the two samplers for low and high concentrations of PM?

Does the shape of particles (somehow related to the mineralogical, and therefore chemical, composition) affect the behaviour of the samplers?

Can you confirm that the PM10 head shown in figure 1 is Tecora PM10, as mentioned in the text?

The acronym PLAS is not frequently used; I would prefer to use OPC (optical particle counter) or OPS (optical particles spectrometer)

line 133: "[particles]air"; do you mean crustal particles??

Line 165: the concentrations reported here refer to PM10 or PM25? Please, specify that are concentrations of sea salt (and crustal) in PM10.

Table 1. Please, add the same information (concentration of crustal and sea salt fraction and Ca species) for samples collected with the commercial PM10 head. You can add the info in Table 1 or in the supplementary. Please, unify the criterion for the number of decimal places - (the same for Tables A1 to A7).

Figure 4: According to figure 4 the flow for PM10 cut is close to 10 L min⁻¹; However, the flow used was 17 l min⁻¹.

Figure 6a: please, change colours and/or shapes of dots. Difficult to discriminate.